2005 RADIUM/ METEL SHOCK SERVICE MANUAL

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2005 RADIUM/ METEL SHOCK SERVICE MANUAL INDEX

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SECTION 1: INTRODUCTION

This manual is intended to guide the user through basic service of Manitou RADIUM/ METEL rear shocks. Service is supported by the identification of common parts and assemblies that have been assembled into Service Kits. The purpose of this manual will be to describe conditions that may drive the need for service and to provide installation instructions for the kits.

Due to the time-consuming nature rear shock service, at this time our primary focus is to offer service kits that minimize the amount of downtime and labor involved. As the program matures, and we are able to gather feed back from our customers, we may offer kits to a more detailed level.

GENERAL WARNING: Rear shocks by design contain gases and fluids under extreme pressure and warnings contained in this manual must be observed to reduce the possibility of injury or possible death. Following these instructions can help you reduce the risk of being injured. Any questions in regards to the information in this manual should be directed to Answer Products Customer Service at (661) 257-4411.

CAUTION: The RADIUM/ METEL Shocks use compressed air to provide fluid pressure in the damping system and spring resistance. These systems must be relieved of pressure prior to servicing. Failure to relieve air pressure could result in injury or possible death.

CAUTION: The RADIUM/ METEL Shock uses precision machined aluminum and other soft alloy components. Using correct tools for assembly is essential to prevent damage.

SECTION 2: SETUP, TUNING, PERIODIC MAINTENANCE

Instructions for shock setup, tuning, and periodic rider maintenance is not covered in detail in this manual. Please refer to the Manitou RADIUM/ METEL Rear Shock Owner's Manual for that information. If you did not receive a manual, you can download one at www.answerproducts.com or contact Answer Products Customer Service at (661) 257-4411.

SECTION 3: GLOSSARY OF TERMS

Air Canister – Can that holds the air spring air in an air shock.

Bottom Out – Point at which a shock reaches full compression.

Control Eyelet (C-End) – Eyelet that is on the rebound adjuster end of a shock. The air canister is attached to this end on air shocks.

Damper Eyelet (D-End) - Eyelet that is on the damper body end of a shock.

Damper Body – Section of shock that contains the damping system

Damper Shaft – Shaft attached to the damper piston that connects the two moving sections (damping system and control eyelet) of the shock together.

Damping System - Controls compression and rebound rate (speed).

DU Bushing – Teflon guide bushing pressed into the eyelets. Mounting hardware is inserted into the DU bushings and rotates within the bushing as need by the suspension design.

Eyelet – Found on each end of the shock, it is where the DU bushing and mounting hardware are and provides the connection between the shock and bicycle.

Internal Floating Piston (IFP) - A floating piston that separates damping oil from the damping system air chamber.

Lockout - Found on QRL shocks. The Manitou lockout significantly increases the amount of load required to compress the shock. The lockout does not prevent compression under load, only increases the amount of load required to compress the shock.

Mounting Hardware – Hardware that allows shocks to be mounted into the wide variety of suspension designs.

Schrader, Air – Black in color, it is the valve for pressurizing the air canister in an air shock

Seals: O-Rings - Black synthetic rubber with a round cross section. Primarily used for fluid sealing.

Seals: Quad Seals - : Black synthetic rubber with an "X" cross section, primarily used for sealing air.

Seals: Wipers – Teflon ring, used for keeping debris out of quad seals, guiding the damper piston, and providing support.

Top Out – Point at which a shock returns to its full extension.

SECTION 4: COMPLETE SHOCK LESS MOUNTING HARDWARE

The highest-level kit offered will be a complete shock without mounting hardware. These kits are offered as a fast replacement where all that is need is to change out the hardware or damping unit.

RADIUM/ METEL Shock – Less Mounting Hardware

SECTION 5: HARDWARE REMOVAL AND INSTALLATION

Mounting hardware is used to mount shocks to the various frame configurations. Over time, hardware may wear between the mounting bolts or DU Bushing which will result in play in the connection.

Remove hardware using pliers as shown in Figure 1

Figure 1

DU Bushing Eyelet

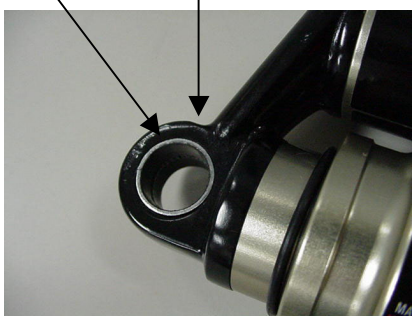


Figure 2

HARDWARE REPLACEMENT

Hardware should have a slight press fit into the DU bushing and can be tapped in place with a rubber mallet or soft jaws in a vise. Apply a small amount of thick grease such as Motorex Bike Grease 2000 (PN 85-0033) to the hardware before installation.

There are virtually an infinite number of hardware combinations in use on bikes today. When ordering hardware from Answer Products, It will be necessary to identify the overall eyelet width, eyelet width, and mounting hole diameter.

HARDWARE REMOVAL AND INSTALLATION- (CONT.)

1. Measure the overall eyelet width.

2. Measure hole size. Current hardware are designed to accept a 6mm or 8mm fastener.

3. Measure eyelet width.

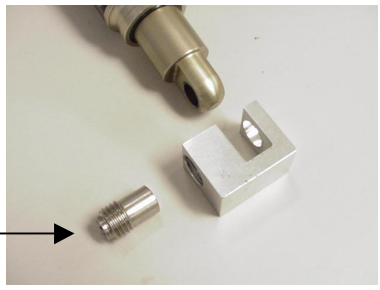
SECTION 6: DU BUSHING REMOVAL AND INSTALLATION

DU bushings are press fit into the shock eyelets at each end of the shock. The hardware fit into the bushings and will rotate slightly within the bushing during suspension compression. DU Bushings, like hardware, may wear over time. Removal and installation is accomplished using tool PN 85-6075.

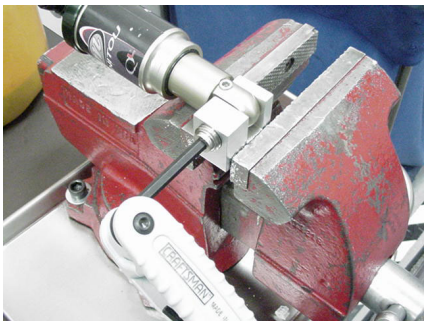
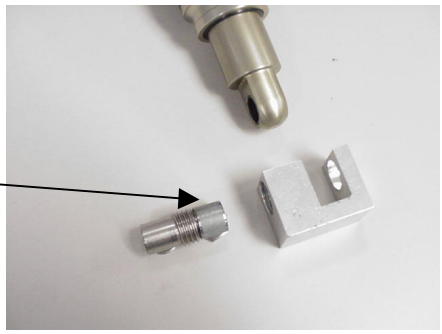
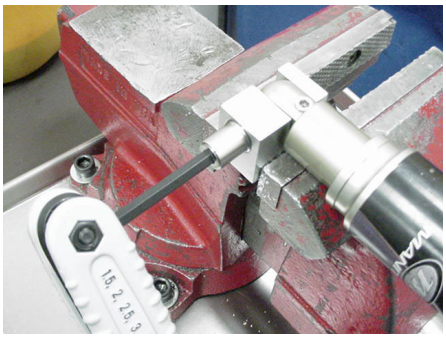
REMOVAL

1. Remove hardware from the shock.
2. Insert unthreaded end of punch into the removal tool first and screw in about half a turn.

Punch →



DU BUSHING REMOVAL AND INSTALLATION (CONT.)

3. Clamp removal tool in vise. 4. Insert eyelet into tool. 5. Use 6mm hex wrench to screw in punch, making sure that it is centered on the bushing. This will press out the bushing.	
INSTALLATION 1. Place a bushing onto the threaded end of the punch and into the removal tool; screw in about half a turn. Bushing →	
2. Clamp removal tool in vise. 3. Insert eyelet into tool. 4. Use 6mm hex wrench to screw in punch, making sure that it is centered on the bushing and that the bushing is centered to the eyelet. This will press in the bushing.	

SECTION 7: AIR CANISTER

Manitou RADIUM Air Shocks use compressed air to provide resistance to compression in place of a coil spring. You must be certain that the air canister is relieved of all pressure prior to servicing the air system. Failure to relieve air pressure could result in injury or possible death.

Failure of an air shock to maintain air pressure is usually the result of defective or worn seals. If there is suspicion of an air leak, the location can be isolated by spraying the air canister joints with a mild solution of dish soap and water. Bubbles will form in from the area of leakage. You can also immerse the shock in water to locate the leak.

Sealing of the shock is accomplished through a series if o-rings, quad seals, and wipers. When the air canister is removed, these seals can be replaced from Seal Kit C.

Seal Descriptions:

O-Rings: Black synthetic rubber with a round cross section. Used for fluid sealing.
Quad Seals: Black synthetic rubber with an "X" cross section, used for sealing air.
Wipers: White Teflon, used for keeping debris out of quad seals.

1. For leaks at the adjuster eyelet or damper end of the air canister, refer to the detailed disassembly instructions below.

2. For leaks at the Schrader valve, release all air pressure and replace the Schrader valve core or assembly as needed.

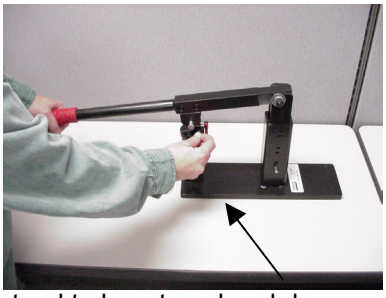
3. If when you pressurize the air canister the shock collapses to its shortest travel position, the shock has an air piston leak into the negative chamber. Place the shock in the shock tester and extend it to its full travel. Depress the adjuster eyelet Schrader while the shock is extended under load. If it remains in the full travel position, refer to the detailed disassembly instructions below for instructions on servicing the air canister and piston seals.

4. If the shock returns to the short travel position, it is not serviceable and the entire shock must be replaced.

Attempting to service a shock with this condition could result in injury or possible death.

Adjuster Eyelet Schrader

Shock in Shortest Travel Position

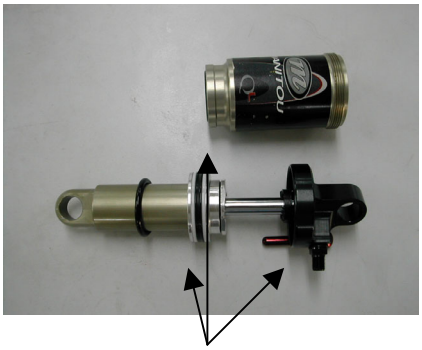


Extend to long travel and depress the air canister Schrader Valve

SECTION 8: AIR CANISTER REMOVAL AND SEAL SERVICE

1. Failure of an air shock to maintain air pressure is usually the result of defective or worn seals. If there is suspicion of an air leak, pressurize the air canister to 150psi from the adjuster eyelet Schrader Valve. Locate the leak by spraying the air canister and Schrader joints with a mild solution of dish soap and water or submerge in a bucket of water. Bubbles will form in the area of leakage.	
2. **Release <u>All</u> air pressure from air canister.** Remove hardware as shown under **HARDWARE REMOVAL AND INSTALLATION.** For leaks at the Schrader valves, release all air pressure and replace the Schrader valve core or assembly as needed. The core is removed using a standard core removal tool. The assembly is removed by removing the core and unscrewing the assembly by inserting a 3mm hex into the center of the valve.	Air release Schrader valve
3. Place adjuster eyelet in a vise using soft jaws. Using a rubber strap wrench to prevent damage, loosen the air canister completely	

AIR CANISTER REMOVAL AND SEAL SERVICE (CONT.)

4. Slide air canister away from the canister eyelet and remove. **Do not remove the damper cap. The damper system is under extreme pressure. Removal of the damper cap without releasing damper system pressure will result in the possibility of injury or possible death.**	Damper Cap: **DO NOT REMOVE**
5. Replace o-rings, seals, and wipers in the air canister and air piston. Air Canister Kit A will have new seals installed as part of the kit. Also replace the o-ring inside the canister eyelet.	 O-Ring, Seal, Wiper Locations
6. Lightly grease the air piston, damper body, air canister seals, and inside the air canister with a thick grease such as Motorex Bike Grease 2000.	

AIR CANISTER REMOVAL AND SEAL SERVICE (CONT.)

7. Slide air canister over the damper body.	
8. Lightly grease the air canister threads and inside the canister. Screw the air canister into the canister eyelet. Due to pressure in the damping system, it may be difficult to compress the shock enough to thread the canister onto its eyelet. If necessary, the shock test fixture can be used.	

SECTION 9: DAMPING SYSTEM

CAUTION: The RADIUM/ METEL Shock uses compressed air to provide fluid pressure in the damping system and spring resistance. These systems must be relieved of pressure prior to servicing. Failure to relieve air pressure could result in injury or possible death.

RADIUM/ METEL Shock damping system service requires special tooling and training that is unavailable at this time. In cases where it is suspected that there is air in the damper or the damper body is leaking oil, the shock should be replaced.

NOTICE: Do not remove the Phillips screw and/or the hex cap on the damper eyelet of the shock. If either/both are removed, the pressure in the shock will be lost and the shock will have to be returned for service and or replaced.

SECTION 10: RADIUM/ METEL SHOCK TROUBLESHOOTING CHART

Symptom	Cause	Solution	Service Section
Air Spring			
Schrader valve snapped off at base	Interference with suspension linkage or other frame components	Replace. Confirm clearance after Schrader replacement	8
Air loss from air spring	Air spring Schrader valve leaks	Tighten or replace Schrader core or replace Schrader assembly.	8
	Seal failure on Air Canister	Replace seal(s)	8
	Seal failure on Air Piston	Replace seal(s)	8
Air shock does not return to full travel but has adequate air spring pressure	Failure of negative spring	Replace air canister and seals	7
Hard top out	Failure of negative spring	Replace air canister and seals	8
Hard Bottomout	Air spring pressure too low	Increase air canister air pressure	8
Damping Oil Leaks			
Oil leak at base of air canister	Worn or damaged seals allowing oil to escape from damper chamber	Replace shock	4
Oil comes out of the Air Spring Schrader valve	Damping oil has leaked past the damper cap	Replace shock	4
Damping System Performance			
Adjusting rebound knob has no effect.	Air in damping system	Replace shock	4
Lockout does not work	Air in damping system, Low IFP pressure.	Replace shock	4
Mounting Hardware			
Play in shock eyelets when mounted in bike	Worn DU bushing or mounting hardware	Replace	5, 6

SECTION 11

TABLE 1
FASTENER TORQUE REQUIREMENTS

Feature	Torque
Swinger Air	
Air Canister	15 – 24KgCm (13 – 21inlbs)
Schrader Valve Stem	5 – 10 KgCm (4 to 9 inlbs)

SECTION 12: 2005 RADIUM/ METEL SHOCK SERVICE KITS

Kit Description	Kit	Radium	Radium R	Radium RL	Metel	Metel R	Metel RP
Air Canister							
Regular Mount 32mm Travel (1.25")	A	83-2221					
Regular Mount 38mm Travel (1.5")	A	83-2222					
Regular Mount 50mm Travel (2.0")	A	83-2227					
Regular Mount 56mm Travel (2.25")	A	83-2228					
Schrader Valves							
Radium & Radium R Air Can Schrader Valve Assy	A	83-2231					
Radium RL Air Can Schrader Valve Assy	A			83-2231			
Complete Shock, Without Hardware							
152mm Eye to Eye, 32mm Travel	B	85-6555	85-6559	85-6563			
165mm Eye to Eye, 38mm Travel	B	85-6556	85-6560	85-6564	85-6649	85-6650	85-6651
190mm Eye to Eye, 50mm Travel	B	85-6557	85-6561	85-6565	85-6630	85-6633	85-6639
200mm Eye to Eye, 50mm Travel	B	85-6558	85-6562	85-6566	85-6631	85-6634	85-6640
200mm Eye to Eye, 57mm Travel	B			85-6567	85-6632	85-6635	85-6641
215mm Eye to Eye, 63mm Travel	B					85-6636	85-6642
230mm Eye to Eye, 70mm Travel	B				85-6645	85-6637	85-6643
240mm Eye to Eye, 76mm Travel	B				85-6646	85-6638	85-6644
Hardware Kits	E						
Seal Kit	C	83-2235			83-2236		
IFP Chamber Refill Plug	B	85-5436					
DU Bushing	E	85-6105			85-6105		
Mounting Hardware Kits	D	(Contact Answer Products)					
Sticker Kit	F						
Sticker Kit, Radium Shock	F	83-2244	83-2245	83-2246	83-2247	83-2248	83-2249

2005 RADIUM/ METEL SHOCK SERVICE KITS (CONT)

Kit Description	Kit	Radium	Radium R	Radium RL	Metel	Metel R	Metel RP
Ride Kits - Springs for Coil Shocks	G						
165 Eye to Eye x 38, Rate: 250	G				85-6660		
165 Eye to Eye x 38, Rate: 300	G				85-6661		
165 Eye to Eye x 38, Rate: 350	G				85-6662		
165 Eye to Eye x 38, Rate: 400	G				85-6663		
165 Eye to Eye x 38, Rate: 450	G				85-6664		
165 Eye to Eye x 38, Rate: 500	G				85-6665		
165 Eye to Eye x 38, Rate: 550	G				85-6666		
165 Eye to Eye x 38, Rate: 600	G				85-6667		
165 Eye to Eye x 38, Rate: 650	G				85-6668		
165 Eye to Eye x 38, Rate: 700	G				85-6669		
165 Eye to Eye x 38, Rate: 750	G				85-6670		
190, 200 Eye to Eye x 50, Rate: 600	G				85-6671		
190, 200 Eye to Eye x 50, Rate: 650	G				85-6672		
190, 200 Eye to Eye x 50, Rate: 700	G				85-6673		
190, 200 Eye to Eye x 50, Rate: 750	G				85-6674		
215 Eye to Eye x 63, Rate: 600	G				85-6675		
215 Eye to Eye x 63, Rate: 650	G				85-6676		
215 Eye to Eye x 63, Rate: 700	G				85-6677		
215 Eye to Eye x 63, Rate: 750	G				85-6678		
222, 230 Eye to Eye x 70, Rate: 600	G				85-6679		
222, 230 Eye to Eye x 70, Rate: 650	G				85-6680		
222, 230 Eye to Eye x 70, Rate: 700	G				85-6681		
222, 230 Eye to Eye x 70, Rate: 750	G				85-6682		
240 Eye to Eye x 76, Rate 150	G				85-6711		
240 Eye to Eye x 76, Rate 200	G				85-6712		
Tools	H						
DU Bushing Tool	H	85-6075					
Fixture to Hold and Compress Shocks	H	85-3008					
Shock Pump - Air Canister	H	85-4069					

2004 RADIUM/ METEL REAR SHOCK SERVICE KITS - DESCRIPTION

A - Air Canister

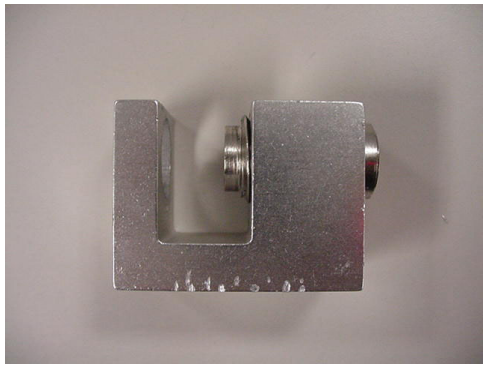
B - RADIUM/ METEL Shock, No Hardware

C - Seal Kit

E - DU Bushing Kit

D - Hardware

F - Sticker Kit



H - DU Bushing Tool